G. H. 72

19

Department of Land Rev + Settt

OFFICE of the Bd of Rev

STATION Madras

Mg' **No.** 2464

2464

Dated 8 - 11. 23

1. 0
Ln
8/11

To whom sent	Date	Initials
	Given for copying	
	Copied	
	Examined	
	Signed	
	Given for despatch	
	Despatched	
	Indexed	
Pages in the file	To be destroyed on	

(SUBJECT.)

Mining - mica (S. Kanara) - Investigation
by the Geological Survey of India - Mr Hobson
report. Go Recorded

Not to be filled in the case of permanent records.

BOARD OF REVENUE
10 OCT 1923
DEPT.
MADRAS

A 4715

Government of Madras

DEVELOPMENT DEPARTMENT

G.O. No. 1409, 27th September 1923

Mining—Mica (South Kanara)—Investigation by the Geological Survey of India—Mr. Hobson's report.

READ—the following papers:—

I

Letter from the Director, Geological Survey of India, dated Calcutta, the 24th July 1922, No. 2700.

I have the honour to state that I am drawing up the programme of the Geological Survey for the coming field season and to request that I may be informed if there is any special investigation that you desire to be included in the programme.

II

Letter from the Director of Industries, Madras, dated the 24th August 1922, No. 577-A/22.

With reference to Government Endorsement No. 1402-II/22-1, dated the 1st August 1922, I have the honour to suggest that the following two items may be included in the programme of the Geological Survey for the coming field season.

* * * * * *

(ii) Investigation of the mica deposits in the South Kanara district.

* * * * * *

3. As regards the mica deposits of South Kanara I may mention that the Board of Revenue recently forwarded a letter from the Collector of the district in which the latter brought to notice the occurrence of mica in the Uppinangadi taluk and suggested that an investigation might be undertaken by an expert or in the alternative, some Madras firm already in the business might be interested in the matter. As the particular sample forwarded by the Collector appeared to be of unusually good quality, I have asked the Board of Revenue to arrange to forward a more representative lot of samples taken at random for display in the Commercial Museum attached to my office so that I can interest Madras merchants in the question of exploitation. I have also asked for information in regard to the estimated extent of the mica bearing area with a map marking occurrences so far noted and information as to the distances from road and railway. It is possible that private parties may start prospecting as soon as the extent of the field is more or less indicated, but I suggest its inclusion in the programme so that the value and extent of the deposits may be more definitely ascertained without delay, for, though the market is at present dull and many of the mines closed down there is little doubt that as soon as the stocks at home are depleted a revival of interest is only a question of time.

III

Letter from the Development Department to the Director, Geological Survey of India, Calcutta, dated the 2nd September 1922, No. 1402 II/22-2.

[Special investigation for inclusion in the programme of the Geological Survey Party.]

With reference to your letter No. 2700, dated 24th July 1922, I am directed to enclose a copy of letter from the Director of Industries, Madras, No. 577-A/22, dated 24th August 1922, on the above subject and to request that the two items for special investigation mentioned therein may be included if possible in the programme of the Geological Survey for the coming field season.

* * * * * *

IV

Letter from the Officiating Director, Geological Survey of India Calcutta, dated the 16th September 1922, No. 3420/398.

I have the honour to acknowledge the receipt of your letter No. 1402-II/22-2, of the 2nd instant, in which you enclose a copy of a letter from the Director of Industries, suggesting the inclusion, if possible, in the field season programme of this department for the coming field season of two additional investigations.

* * * * *

Concerning the second problem, viz., examination of the mica deposits of South Kanara, it will be possible to make suitable arrangements next April, when the services of either Mr. Hobson or of the other officer just refered to may be available.

V

Letter from the Director, Geological Survey of India Calcutta, dated the 14th April 1923, No. 1652/398.

* * * * * *

2. I am deputing Mr. Hobson to make the required investigation of the mica deposits in the South Kanara district. I should be glad if you will issue the usual instructions to the district officers to render him all assistance in his work. Mr. Hobson will inform you himself of the probable date of his arrival. It will be towards the end of April or the beginning of May.

VI

Letter from the Director, Geological Survey of India, to the Secretary to the Government of Madras, Development Department, dated Calcutta, the 24th July 1923, No. 2873/1168.

[South Kanara Mica Investigation by Geological Survey of India.]

In continuation of this office letter No. 1652, dated Calcutta, the 14th of April 1923, on the subject quoted above, I have the honour to forward herewith a copy of the report on the mica occurrences of the South Kanara district, Madras Presidency, by Mr. G. V. Hobson, Assistant Superintendent, Geological Survey of India.

ENCLOSURE.

REPORT OF THE EXAMINATION OF THE MICA OCCURRENCES IN THE SOUTH KANARA DISTRICT, MADRAS PRESIDENCY, BY G. VERNON HOBSON, A.R.S.M.

INTRODUCTION.

Reasons for the examination.—From the somewhat limited correspondence on this subject which I have seen, it appears that the occurrence of mica was reported from the Uppinangadi taluk to the Collector, South Kanara, and the latter submitted samples to the Industries Department, Madras. This department brought the samples to the notice of some one interested in mica in Gudur, Nellore district, who reported it to be mica of exceptionally good quality.

The Industries Department then called for further samples, some details and a map showing the limits of the deposit, to which answer was given that an expert would be required to map the limits of the deposit. The Development Department, Madras, then asked for the services of an officer of the Geological Survey.

Objects of the examination.—In view of the foregoing details I considered that the object of the examination was to inspect deposits of mica already found, to determine and map the limits of such deposits, examine the mica as to its marketable qualities and observe local conditions which might affect possible future mining operations, such as accessibility of the deposits, communications, indigenous labour supply, climate, etc.

TOPOGRAPHY.

The South Kanara district lies between the sea on the west and the Western Ghauts on the east, the eastern boundary running along the ghauts at heights varying from one to seven thousand feet above sea level and corresponding roughly with the watershed.

The ground drops sharply from the ghauts and the district is essentially a coastal plain, with however the distinctive feature that whilst the general aspect is of a country of uniform flatness, yet this is infinitely diversified.

The rivers and streams are comparatively short and, particularly in the monsoon season, are very swift flowing, with the result that the whole country has been cut up into a network of river basins, valleys and hollows, with hills and ridges flattened at the same general level and bounded by abrupt, wall-like cliffs. Thus in traversing an apparent wide plain, you will encounter a sudden ravine, necessitating a considerable detour. Though the general direction of the rivers is, of course, from east to west, the network of streams is so highly developed that water flowing in all directions is encountered.

Uppinangadi taluk, the one chiefly concerned, is the only inland taluk of the district and thus further from the coast, its headquarters, Puttur, being 31 miles from Mangalore and the taluk lies chiefly to the east for a distance of roughly 35 miles. Thus this taluk contains a fair proportion of high ground, but in no case had there been an occurrence of mica reported over 1,000′ above sea level, the majority being in the neighbourhood of 400–500′.

For the most part the country is heavily jungle covered which, coupled with the abrupt, cultivated valleys, makes it difficult to get about, once the main roads are left.

Geology.

Though not making a geological survey of the district, the geology has such an important bearing on the object of the examination that some brief observations of the general geology are most necessary.

The most striking fact here is that the whole district, as far as observed, is covered with what may be termed a laterite. That this is a true laterite appears to be somewhat doubtful and there are indications that it is possibly a weathered form of the gneiss of the district.

This view appears to be upheld by the appearance of lamination or foliation in the laterite, giving it an apparent strike and dip. Also the gneiss, where seen, often appears to merge into the laterite with no marked dividing line.

In any case, however, this so-called laterite covers the district to a greater or lesser depth and in consequence exposures of the living rocks of the district are very few and far between.

These, however, appear to be rather fine-grained gneisses, usually rather quartzitic and in places having what almost appear to be quartz veins, but are actually highly silicified bands, one such band near Arantod contained muscovite up to $\frac{1}{2}''$ across the basal plane.

A characteristic feature of the gneiss is the fact that it weathers out into hogbacked hillocks and humps, in fact in many places the weathering results in layers of the rock scaling off much as the successive layers of an onion can be removed.

These gneisses are mainly grey or greyish white, whilst some are darker in colour due to the presence of considerable biotite.

There are also some indications of amphibolites probably in the form of dykes.

As already mentioned, however, the rock exposures are very sparse but nevertheless there appears to be an absence here of any belt of micaceous, hornblende and other schists, such as those with which the pegmatites of both the Nellore district of Madras and the Hazaribagh district of Bihar are associated.

The gneisses themselves are rather finely crystalline and I saw no trace of a pegmatite vein *in situ*, but as the exposed area is only a fraction of one per cent of the whole, it is impossible to make definite observations.

In no case did I find any mica or pegmatite *in situ*, all the occurrences which I saw being accumulations of surface mica.

Communications.

Railways.—The district is served by one railway only, namely, the South Indian Railway, broad-guage line, which enters the district from the south, following the coast as far as Mangalore where the line at present ends, the distance by rail from Madras being some five hundred and fifty miles. As already mentioned the road distance from Puttur to the railway at Mangalore is thirty-one miles.

Roads.—Comparatively speaking the Uppinangadi taluk is well equipped with roads. There is a first-class metalled road from Mangalore to Mercara which passes through this taluk from Puttur to Sampaje, tapping the south-western borders of the taluk. This road is bridged throughout and open for traffic all through the year.

Udipi taluk from which one occurrence was reported is served by a coast road which is cut by some four rivers which have to be crossed by ferry, whilst the recent construction of a bridge has now opened a through route for vehicular traffic, somewhat inland.

Gurpur Bridge apparently

In addition to the road mentioned above the southern portion of Uppinangadi taluk from which mica was reported is served by two east and west roads converging on Subrahmanya, to the south of the river Kumaradhari and one from Subrahmanya to Uppinangadi to the north of this river.

There are two more roads in the northern part of the taluk but these are outside the area from which mica was reported.

The three roads in the southern part are also interconnected to some extent. These roads are unmetalled but on the whole the laterite on which they run would appear to give a fairly satisfactory road surface; they are, however, almost entirely unbridged and this has the result that in the wet season passage along these roads is uncertain.

The rainfall is very heavy in this district with the result that the mountain streams rise very rapidly and are very swift-flowing, they fall equally rapidly during a break in the rain, but communication is often cut off for considerable periods.

Once these main roads are left there are only footpaths which are very tortuous and not easily followed.

Rivers.—As a means of communication the rivers of the district are not of much value, they can be, however, and are, used up to the limit of the tide; beyond this limit little use is made of them and they could not be readily improved.

Ocean.—Ocean transport would be available from Mangalore, which could replace railway transport if found more favourable.

Descriptions of Localities.

The following is a brief description of each locality visited; these do not include all the localities from which mica had been reported, but owing to the breaking of the monsoon which rendered movement difficult and uncertain, and also the fact that it appeared unlikely that any useful purpose would be served by extending the examination, the remaining localities were not visited.

Ulamogaru village, S. No. 50.—The mica occurrence reported from this village is situated some 50 yards east of the Puttur-Sampaje road just short of the 37th milestone. The ground all round here is laterite-covered, a cart-track had been cut here and it was in this that the mica was pointed out to me. This consisted of minute scraps of surface mica in the soil, none of which reached 1 " across, so this occurrence could be dismissed as of no importance.

Madnur village, S. No. 179.—Mica had not been reported from this village, but information of an occurrence was brought to me whilst I was there and I went to examine it. The occurrence was at a point about $1\frac{1}{2}$ miles south-west of Kav on the south bank of Mudnuru Hole. This also was an occurrence of surface mica in the soil, the pieces were quite small and not abundant. The whole area is laterite-covered and in a stream near by, this is shown to be at least 12–15′ in thickness. This occurrence is also of no importance.

Mudnuru village, S. No. 181.—The occurrence shown to me in this village, lies about $1\frac{1}{4}$ miles due west of the Puttur-Sampaje road at Guddadka, and is just on a corner of the Anegundi reserved forest.

This occurrence lies on the top of an east and west ridge between two streams. The ridge top consists of a very rotten rock, which is probably a weathered gneiss. The mica I saw was fairly fresh but only in small pieces, though comparatively plentiful.

This occurrence appears to be almost *in situ.* I was informed that during certain months, pieces up to 4″ by 6″ were found, washed out I suppose by the rains. I saw nothing like this and failing such evidence, I should not advise spending money on further investigation. Should however the above fact be substantiated and the mica prove to be marketable, then some investigation of the ridge by trenching might be justified.

Sullia village, S. No. 130.—The occurrence here is situated on slightly rising ground in the fork of streams three-fourths mile due south of Koladambe on the Jalsur road, $6\frac{1}{2}$ miles east of Jalsur.

Here again all that can be seen is surface mica of small size in the soil, there is a fair quantity but none of a marketable size and much of it is badly buckled. The ground is all laterite-covered and nothing *in situ* can be seen.

Arantod village, S. No. 126.—Mica had not been previously reported from here but was brought to my notice and I went to examine the occurrence. I was taken to a point where a footpath from the Puttur-Sampaje road to Deraje crosses an arm of the Pumale reserved forest. Some boulders of what appeared to be a quartzite with mica were pointed out to me but nothing *in situ* could be found and the mica was very small. From rock exposures in the stream, this appears to have been an area of considerable disturbance.

Sampaje village, S. No. 124.—The mica occurrence reported from here was situated in a cultivated valley at Kilar, just on the edge of the Sampaje reserved forest, and consisted of a few boulders of what had the appearance of being pegmatite, the crystallization however was on a small scale and I saw no mica over the size of a rupee; this was of a green variety corresponding to the green spotted mica of the Nellore district.

No pegmatite *in situ* is to be seen here. The source of these pegmatite boulders is possibly in the high ground to the north, which is all forest clad and therefore a search would probably be expensive, and an undertaking which is not justified by the evidence at present available, whilst the presence of laterite also renders exposures unlikely.

Kalanja village, S. No. 66.—The occurrence reported from this village is situated on a slight ridge about three-fourths mile south south-west of the road junction on border of Balila village S. No. 65 and Kalanja village.

The occurrence is on the north-east side of the ridge and merely consists of a patch some 6′ by 3′ where the soil has been disturbed to a depth of 3–4″ revealing scraps of mica in the laterite soil. This occurrence can be dismissed as of no importance.

Kuthkunja village, S. No. 112.—The occurrence reported from this village lies in the Bantamale reserved forest on the north slopes of hill 1025.

This, I understand, is one of the places from which the original three samples were sent to the Director of Industries.

There is a forest road winding up the northern slopes of hill 1025 and it is at a point on this road, some distance from the top that the mica is seen. This again is a collection of surface mica found in the laterite soil forming the side of the road.

The mica here is of larger size than any elsewhere, running up to 2″ by 3″ but much of it is buckled by pressure, cross grained and flawed. There is however a little from which the smallest size of marketable mica could be cut.

I had some excavating done here but did not discover anything *in situ* and did not proceed with the work as I did not consider it justified. I was told that this was the only point where mica was found and for lack of time to examine further I had to accept this statement as correct.

The presence of this pocket of mica appears to indicate a source nearby, as had the mica travelled far it would have become scattered and it is noteworthy that there is no other indication of mica on this road though considerable cutting has been done on it.

Even if the presence of a pegmatite were proved, the surface indications do not hold out much promise that it would be a paying proposition.

Vitla village, S. No. 161.—The occurrence reported from this village is situated within 100 yards of the district board inspection shed in the village

The occurrence merely consists of scraps of mica in the ditch on one side of the road here, and can be dismissed as of no importance.

AREA COVERED.

In addition to the places visited, as described above, mica had also been reported from Kombar and Bilinile in Uppinangadi taluk and from Brahmawar in the Udipi taluk.

Taking Mangalore as the origin it will be seen that mica has been reported from points about 38 miles to the north, 58 miles east and 58 miles south-east, these distances being approximately as the crow flies.

Kombar and Bilinile are the remaining two places from which the original samples were obtained. I was unable to visit these places owing to the breaking of the rains, but from information gained at Panja and from an examination of the duplicate set of samples with the Director of Industries, I should say that these occurrences will be similar to that examined at Kuthkunja.

As regards the occurrence at Brahmawar, the Collector, South Kanara, informed me that in this case small pieces of mica had been exposed in sinking a well near the Local Fund bungalow. I did not think it was worth travelling so far to see this on the above information.

It will be seen from the descriptions that in no case has pegmatite been found *in situ* and the fact that the mica increases in size and quantity as one proceeds east rather leads one to think that this mica has been carried westwards and the further it is to the west, the smaller it is as one would expect.

This does not however explain the fact that the mica is not apparently distributed more or less over the district as would be the case if it had been mechanically carried from its source, but in fact confined to very local spots.

LABOUR.

Except on the coast line this district appears to be very sparsely populated. The people here are purely agriculturalists and they live right on the land they cultivate, with the result that instead of being collected together more or less into villages, the population is scattered over the district, almost every valley having its two or three houses in which the people live who cultivate that valley.

Thus indigenous labour in this district would probably be quite inadequate to provide a labour force for mines. Labour would have to be imported, but this labour should be supported by the agriculture of the district when once obtained.

CONCLUSIONS.

In coming to any decision as to the possible commercial value of the mica occurrences in the South Kanara district, three facts have to be considered in the first place, namely,—

(*a*) That as far as I have observed, no mica *in situ* or mica-carrying pegmatite *in situ* has up to now been discovered.

(*b*) Prospecting in this district is rendered exceedingly difficult owing to the almost universal covering of laterite of greater or lesser thickness, and in much of the district by the heavy growth of jungle.

(*c*) That a fair marketable product has not so far been procured.

Of these the first is the most important and so long as this holds true the occurrences cannot be regarded as of any value inasmuch as a collection of surface mica will be rapidly exhausted and if mica *in situ* has not been disclosed in the meantime, the operations will come to an untimely end.

The second fact is such as to discourage any systematic search being made unless it can be based on much more favourable evidence than is available here at present, as the cost of prospecting by trenching is likely to be very heavy where any thickness of laterite has to be cut through.

The third fact will further discourage such prospecting as the class of mica at present obtained is not such as would repay even a fraction of the prospecting costs. In the Nellore district the value of the surface mica obtained has frequently paid for the preliminary prospecting work during which the surface mica was got.

In this case I have seen no mica which would cut to anything above the smallest rounds for splittings and even this only forms a very small fraction of the whole, most of the mica is too small and much of it is buckled, cross grained and otherwise rendered useless.

The fact that over so large an area surface mica has only been found in so comparatively few isolated spots, I should also regard as an adverse circumstance, coupled with the fact that as far as my experience goes the gneissic rocks, which appear to form the living rocks of this district are not those in which mica of commercial value is usually found.

In view of all these circumstances I do not consider that the prospects are such as may be expected to attract commercial firms, and I do not think that the circumstances call for any expenditure of money by the local officials in an attempt to gather further information.

Should it at any time be decided to make further examination, this would most profitably take the form of an attempt on a small scale to establish the presence *in situ* of mica-carrying pegmatite, in either the Kuthkunja, Konbar or Bilinile areas, and it should be borne in mind that a marketable product should have roughly the following properties.

It should be perfectly flat, flexible and free from cracks or flaws, of a similar character, inclusions such as garnets and quartz render the enclosing mica useless but inclusions which do not affect the lamination are not very serious except that iron inclusions render the mica useless for electrical work, such mica must have a superficial area of not less than one square inch and there must be a reasonable proportion of large sizes to give a paying proposition, the demand for waste and scrap mica in this connexion can be ignored.

I mention these facts as in many cases I found that village officials had been requested to keep a look out for and to report any occurrences of mica with the result that any point where scraps of mica had been found was reported, as the officials had little or no idea as to what kind of mica was wanted and thus reported anything. Whilst any expert discrimination could not be expected from the officials, still a slightly clearer conception of what was wanted would, I think, increase the value of the reports sent in.

In view of the foregoing conclusions any discussion of the other points appears unnecessary, but it may not be out of place to mention them briefly.

As pegmatite *in situ* has not been discovered it is of course impossible to determine and map the extent of the deposit, as in effect no deposit has yet been found.

As regards communications, the position is quite fair having in view the fact that in mica-mining a finished product only need be transported from the mine, thus greatly reducing the weight to be handled.

There would be some difficulty in getting machinery to a mine such as pumps or boilers but as this would be a non-recurring difficulty it would not be too serious, as in any case the distance to be covered from the nearest road would probably not exceed three miles.

As regards the unmetalled roads, the building of bridges on one or other of them would ensure continuity of transport facilities to the Subrahmanya district if such became desirable.

A drawback in the case of mica-mining becoming an industry here is the distance which has to be covered to the nearest market. Thus by rail the product would probably have to go to Madras, a distance of 550 miles, or by sea to Bombay, prior to being shipped abroad.

As regards labour, it has been pointed out that in all probability labour would have to be imported.

The climate will have an effect inasmuch as during the monsoon season, care would have to be exercised to keep the mines open and any attempt to work opencast would entail closing the pit during the rains, as it would probably be impossible to exclude surface drainage. On the whole, however, the conditions should be favourable for mining here, but that there is mica here to make mining worth while appears to be very doubtful.

CALCUTTA,
21st July 1923.

G. V. HOBSON,
Assistant Superintendent, G.S.I.

APPENDIX A

Location of places mentioned in this report.

The survey numbers of the villages are given as in some cases there are two or more villages of the same name in the taluk.

	Latitude.	Longitude.
Mangalore	12° 51′ N.	74° 53′ E.
Puttur	12° 45′ N.	75° 12′ E.
Ulamogaru (50)	12° 42′ N.	75° 15′ E.
Madnur (179)	12° 38′ N.	75° 16′ E.
Mudnuru (181)	12° 37′ N.	75° 17′ E.
Sullia (130)	12° 35′ N.	75° 25′ E.
Arantod (126)	12° 32′ N.	75° 27′ E.
Sampaje (124)	12° 30′ N.	75° 33′ E.
Kalanja (66)	12° 39′ N.	75° 24′ E.
Kuthkunja (112)	12° 39′ N.	75° 29′ E.
Bilinile	12° 43′ N.	75° 35′ E.
Kombar	12° 46′ N.	75° 34′ E.
Brahmawar	13° 26′ N.	74° 45′ E.

In the case of those places in a bracket, the approximate latitude and longitude at the point from which the mica was reported, is given.

VII

Letter from E. F. THOMAS, Esq., C.I.E., I.C.S., M.L.C., Director of Industries, to the Secretary to Government, Development Department, dated the 10th September 1923, No. 379-A/23.

With reference to Government Endorsement No. 1828-II/23-1, dated the 28th August 1923, I have the honour to state that in view of the discouraging nature of Mr. Hobson's report, I do not think that any useful purpose would be served by pursuing the question of the exploitation of the mica deposits in South Kanara any further at present. A company under the name of the Malabar Mica-Mining Syndicate has recently applied for a prospecting licence over certain areas in the South Kanara district with a view to prospecting for mica and I suggest that the exploitation of the mica bearing areas in the district may well be left to private enterprise. In point of fact, when proved deposits in other districts are not being

worked owing to the extreme dulness of the mica trade, there would seem to be no object in attempting to exploit the very doubtful deposits, or rather occurrences, in the South Kanara district.

2. There is one point in Mr. Hobson's report that is worth passing notice. Mr. Hobson, misled apparently by the absence of villages which is typical of the West Coast districts, considers that a labour force could not be found locally. South Kanara however supplies a considerable labour force for the Wynaad and the population is much denser there than an uninstructed observer, ignorant of local conditions, would be apt to imagine.

VIII (K)

Proceedings of the Board of Revenue (Land Revenue and Settlement), Mis. No. 2017, dated 10th September 1923.

J. M. TURING, Esq., I.C.S.,

Commissioner of Land Revenue.

[*Reference*—Government Endorsement No. 1828-II/23-1, Development, dated the 28th August 1923.]

The Board agrees generally with the conclusions formulated by Mr. Hobson.

(True extract)

S. WADSWORTH,
Secretary.

To the Secretary to Government, Development Department.

Order—No. 1409, Development, dated 27th September 1923.

Recorded.

2. The Government accept Mr. Hobson's conclusions in regard to the prospects of mica-mining in the South Kanara district and direct that no further official action need be taken in the matter.

(By order of the Governor in Council)

F. NOYCE,
Acting Secretary to Government.

To the Director, Geological Survey of India (with C.L.).
,, Board of Revenue (Land Revenue and Settlement).
,, Director of Industries.
Editors' Table.

Forwarded to the (Board of Revenue (L.R. & Sett.)

(By order)

Superintendent. 29.10

Res Mis 21647 8.11.23

Communicated to the Collector of S. Kanara.

To the Collector of S. Kanara.
with a Sc of the Go.